Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

Potato Gene Resources

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With deep roots in agriculture, Potato Research Centre celebrates 100 years

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Potato Research Centre Director of Operations, Edward Hurley.

In 2012, Agriculture and Agri-Food Canada's (AAFC) Potato Research Centre in Fredericton celebrated 100 years, a century of science that helped transform agriculture. But the centre's director of operations, Edward Hurley, says that may have only been the warm-up act.

"I think we are looking at another century of huge change," says Hurley. "Maybe even bigger than we've seen before." That's a tall order. As game-changers go, 20th century science and technology re-wrote the way food was produced.

The lights came on, horsepower replaced a horse's power, hybrid crops took a tougher stand in the field, computers came to the farm and DNA shed some of its secrets. But Hurley is convinced we haven't seen anything yet, especially when it comes to Canada's largest and most lucrative vegetable crop.

Four years after the United Nations named the potato as the food of the future for a hungry planet, the Potato Research Centre is continuing to unearth new opportunities for the spud. It has become a go-to place for potato research in the international science community, linked closely with the International Potato Centre in Lima, Peru, and leading potato research centres in Europe.

Working in close collaboration with the department's Lethbridge Research Centre in Alberta, the Potato Research Centre leads Canada's potato breeding program. From a main facility just outside Fredericton and a research farm in Benton Ridge an hour west of the city, scientists are using molecular chemistry, a complete genetic map of the potato and a new understanding about the healing power of food to re-think the potato's potential.

For potato farmers like Joe Brennan, it could mean a future where more environmentally

friendly new potato varieties get star billing on grocery shelves for their nutritional value, taste and, in some cases, their wild colours. "The need for change is probably greater than it has ever been," says Brennan, chair of the farm organization, Potatoes New Brunswick, and a grower who can trace his family's farm back to the 1860s. "Diversification is the next wave."

Hurley says diversification means looking at the potato not just as a food, but also as an ingredient. He expects potato starch will be one of those ingredients that will take hold in a bigger way in food processing and in a host on non-food products like biodegradable plastic.

Growing a better potato has been a goal of the Potato Research Centre since 1929, when it launched its potato breeding program. Since then, the centre has released 29 new varieties of potatoes, including the "Shepody", North America's second most-popular French fry variety.

It currently has three new varieties going through the final stages of certification, the last step before being given a name and a launch into the marketplace. But if the Centre's future belongs to the potato, its past is deeply rooted in every aspect of agriculture.

When workers began clearing land in September 1912 for the new Fredericton Research Centre, farmers in the region were struggling. Crops were plagued by low soil fertility and ravaging disease and insects. Livestock mortality was high. Scientists went to work evaluating new crop varieties and new breeds and looking at new ways to farm. Along the way they tested more than a thousand varieties of vegetable and fruit crops and evaluated dozens of breeds of horses, dairy and beef cattle, pigs, sheep and hens.

Jennifer MacDonald, president of the Agricultural Alliance of New Brunswick, says the Centre has played a crucial role for farmers and their industry. "Our world has changed a lot in the last 100 years and the Centre has helped us change with it," she says. "As farmers, we depend on research to keep our farms productive, competitive, and to help keep on delivering high quality products to the consumer. The importance of this is immeasurable."

Newfoundland Potato Grower Captured in the War of 1812 – the Story of Ann Hulan

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Mrs. Ann Hulan is well known in Newfoundland history and folklore. She was known as the Queen of St. George's Bay. She was the matriarch of the Hulans and served as a Fishing Admiral (local law authority and settler of disputes) until she was in her 70s. Mrs. Hulan was the only lady Fishing Admiral in Newfoundland history.[1,2]

Ann's family came from the Channel Islands and settled on the south coast of Newfoundland. Ann was born about 1760 and while she was quite young her family moved to the St. George's Bay area.[3] When James Cook was surveying the West coast of Newfoundland, Ann would have been approximately 7 years old. Family lore says Cook visited Ann's home but there is no written record of this having occurred. Ann married James Hulan (Huelin) possibly in the 1780s and they, like other settlers, had a summer home near the shore, convenient for fishing, and a winter home further inland in a more sheltered area.[1,3,4]

W.E. Cormack, the first white man to have walked across Newfoundland, met Ann in 1822 and claimed she was a lady in her 60s. He wrote:

"....notice must be taken of the farm of my hostess, Mrs. Hulan, at the second Barasway river. The stock on it consisted of six milch cows, besides other cattle; the dairy could

not be surpassed in neatness and cleanliness, and the butter and cheese were excellent: the butter made, exclusive of what was kept for her comparatively numerous domestic establishment, was sold, part to the residents at other places in the bay, and part to trading vessels that come to the coast in summer. The cellar was full of potatoes and other vegetables for winter use. She was also an experimental farmer, and exhibited eight different kinds of potatoes, all possessing different qualities to recommend them. Of domestic poultry there was an ample stock. Mrs. Hulan, although not a native, had lived in St. George's Bay upwards of sixty years, and remembers the celebrated navigator, Cook, when he surveyed the coast."[5]

Three of the varieties of potatoes Mrs. Hulan developed were still in use up to the 1960s.[1] The only potato name still remembered is "Early Fortune", a moist, good tasting potato[1]. One wonders if the term "Fortune" comes from Fortune Bay, on the South Coast of Newfoundland, where Mrs. Hulan was born.

James Hulan had built a schooner, *Industry*, and after he died in the first decade of the 19th century, Ann took over the vessel for shipping fish and animal skins to St. John's and other ports. On one trip in 1812, the vessel was near Cape Race when it encountered an American privateer, the *Benjamin Franklin*, which took *Industry* as a prize. The War of 1812 had started. *The Industry* along with Ann Hulan and her crew were taken to New York where months later a court of enquiry decided that Mrs. Hulan and crew in their small schooner were no threat to the Country. One of Ann Hulan's descendants managed to obtain copies of the proceedings and found that she had impressed the Commissioner to the extent that he wrote the Secretary of State, later President James Monroe, suggesting that the ship and company be considered "objects of charity rather than prisoners of war". Monroe agreed and issued safe conduct papers. The captured ship was sold at auction for one dollar with Ann Hulan the only bidder. Even part of her cargo of salmon and furs was returned. [3]

Archdeacon Wix visited Mrs. Hulan and recorded his visit in his published diary:

"Walked to the First Barrisway, where three families live, and the widow, Anne Huelen, a native, the mother of the settlements. The recollection of this cheerful old lady is unimpaired, and carries her back to the history of the island for the greater part of a century, and this a most interesting portion of the history of Newfoundland,--as it takes in the troubled periods in which the French and American privateers inflicted such incalculable hard-ships on the simple inhabitants of this coast. In 1814, soon after the loss of her husband, she was proceeding with one of her daughters, and her catch of cured salmon, to St. John's, for the arrangement of her affairs, when she was captured by an American privateer, and carried to New York. Her cargo was sold there by a writ of "venditioni exponas." She showed me her pass-papers, which were signed by James Monroe, then secretary to the President of the United States. She speaks with lively gratitude of the very humane attentions which were uniformly paid her while she was detained in New York, especially by a Mrs. Sophia Doty, after whom and Mr. Doty, she had two of her grandchildren, Sophia and Elihu, named after her return to Newfoundland. She was allowed, too, very kindly, to buy in her own schooner at the nominal price of one dollar, which a benevolent American put into the poor creature's hand at the moment, for the purpose of effecting the formal purchase."[6]

(P.S.: Wix recorded the date of capture as 1814; it was 1812).

References

[1]Hulan, Dr. H. Bud, a great great great-grandson of Mrs Hulan, personal communication

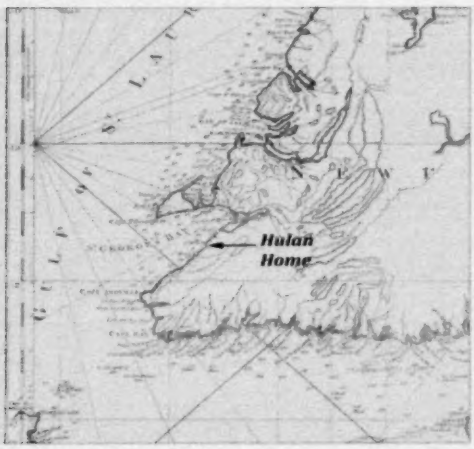
[2]The Trident; Newsletter of the Newfoundland Historic Trust, July 1966.

[3]Harrington, Michael Francis; *Ann Hulan, A Newfoundland Pioneer*, The Atlantic Advocate, January 1981

[4]Butt, Kirk; *Early Settlers of Bay St. George, The Inner Bay, Vol 1*, Boonen Books, Whitby, Ontario, 2007.

[5]Cormack, W.E.: *Narrative of a Journey Across the Island of Newfoundland in 1822* (http://www.mun.ca/rels/native/beothuk/beo2gifs/texts/HOW19b.html).

[6]Wix, Archdeacon [1802-1866]; *Six Months of a Newfoundland Missionary's Journal from February to August, 1835, second edition*, London: Smith, Elder and Co., 1836.



Part of a General Chart of the Island of Newfoundland by James Cook and Michael Lane and others, Published by Thomas Jefferys, 1775. Courtesy: Centre for Newfoundland Studies, Memorial University of Newfoundland.

A Study of Heat and Drought Tolerance – Growing Potatoes in Bags

Curzio Caravati
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For the last 5 years, I have been growing a collection of 300 potato varieties, mostly heritage but also a few modern cultivars. Eighty of these varieties are maintained at the Potato Gene Resources (PGR) Repository in Fredericton, NB, Canada while others are maintained as *in vitro* material at The Seed Saver Exchange and/or the Potato Research Station in Sturgeon Bay, WI, USA.

The Kenosha Potato Project started as an effort to preserve genetic diversity as garden grown tubers, rather than *in vitro* material. It is our belief that heritage tubers should be readily available to gardeners in order to keep the heritage alive. (Keeping genetic diversity in the lab, could potentially result in people losing memory of what made those crops an heirloom.)

As our collection grows, the primary goal of preserving genetic diversity has shifted to additional tasks of field research, including production of higher yields in containers, tolerance to extreme heat and drought, botanical seed production, and identifying taste characteristics other than for the purpose of French frying and chipping.

Production of higher yields in containers

We study the potato by growing vines in Potato Growing Bags. This method came about as the collection grew in numbers and it became difficult to manage in a traditional field. We found it to be very convenient to grow each variety in a tagged bag. The bags are kept in the garden in compact double lines of ten to fifty bags. This results in 100 varieties fitting in 225 square feet. Imagine how many varieties can fit in a relatively small garden.

Growing potato vines in bags presents a number of challenges because the soil contained in the bag is more likely to dehydrate and dry up. The vines are not able to fully develop the root system and, consequently, tubers tend to develop smaller in size. This study is ongoing but we have already recognized that the key factor is moisture retention. Compost is the best soil for the purpose. We are testing soil mix formulas with other ingredients to further improve moisture and fertilizer delivery to the vines.

It seems obvious that a larger number of tubers can be produced by crowding the vines in each bag. We have tested one to six seed pieces per bag and found that three seed

pieces placed closer to the center of the bag work best. It is to be noted that we plant whole tubers (not cut pieces) of about two ounces in weight. These seed units, also known as mini tubers, keep the vines alive even during extended periods of drought.

Finally, we hope to find which varieties produce larger yields when grown in containers. For instance, we have observed how some varieties have a tendency to set tubers higher (as much as 24 inches above the seed piece), rather than deep, attached to short stolons. The combination of seed crowding and larger vertical tuber setting may lead to a substantial yield increase. We have harvested no more than four pounds of spuds per bag but have received reports of much higher yields. In our garden in Kenosha, Wisconsin, the bags have been kept in a garden without access to water. Without watering through the growing season, tuber bulking is very unlikely.

Curzio Caravati in front of 100 potato growing bags.

Heat and drought resistance

Over the years, we have observed that some varieties are able to develop larger tubers in the bags without watering, at clearly higher average soil temperatures. Without access to water in our garden, and totally dependent on rain fall, the summer of 2012 proved to be the ultimate test for heat and extreme drought resistance. Kenosha, located in the South Eastern corner of Wisconsin, has experienced both record high temperature days and extreme drought. Under these extreme conditions, we have found a number of varieties that failed miserably while others survived rather well. Not surprisingly, the total yields for the project have been the worst ever, but in some bags we did find large tubers, up to 14 ounces for the variety "Sarpo Mira" and 5 tubers in the 4- to 10-ounce range for the accession variety "Up To Date".

The results for each growing season are recorded by total weight, and number of tubers divided by size. Another great benefit of using bags is the possibility of counting each tuber produced on the vines, even the smallest, as little as a pea. Higher crop yields are obtained by either increasing the bulking (larger tuber sizes) or the number of tubers. In one bag, tagged for the Chilean landrace variety "Morada Ojuda", we have found 140 tubers mostly in micro size, but a few larger than 2 ounces in weight were found. For varieties that set this large number of tubers, optimizing the tuber size in the 2- to 4-ounce range may also be a desirable result.

Botanical seed production

Restriction of root system growth in the bags may explain why very few varieties develop seed berries. It is well understood that different potato varieties will flower and develop berries for the harvest of botanical seed, more or less depending on several factors, including soil type and day length. At the lower latitude settings of Kenosha, we have successfully harvested seed for many varieties in the past, while tubers were grown in the garden in traditional furrows. Since we have switched to growing the entire collection in bags, the number of varieties that produce berries has collapsed to very few. In 2012, the additional stress factor of the extreme drought has lowered the number to 2, including the accession variety "Blue Shetland" (also known as "Shetland Black"). But the champion of this abnormal year is the Peruvian variety "Dheera", which has produced several cups of berries. In the past, the accession variety "Blue Victor" has been the champion for consistent berry production, even grown in bags, but the 2012 extreme conditions were not favorable for berry production.

End of July – keeping track of flowers and seed pod growth.

Identifying taste characteristics

Recently, The Kenosha Potato Project was offered the opportunity to cooperate with the United States Department of Agriculture, Potato Research Station. Specifically, we have been asked to provide taste descriptions for heritage and exotic landrace varieties by designing a method for potato tasting that goes beyond the scientific methods used to evaluate French fry and chip processing characteristics. Potato tubers grown in pots in a greenhouse environment hardly could fit the culinary need, while the rich compost that we use in our growing bags provides the perfect solution.

The identification of the potato taste characteristics is the base for the "Potato Sommelier" – to develop a palate for different varieties prepared in different recipes. Certainly not an easy task! But everything starts with the availability of many potato varieties to cook and compare. Everything starts with the methods of cultivation which enhance potato flavor. Very much like any vegetable, potato tubers develop flavor when grown in organic, mineral rich soil. The infinite gamut of trace elements that are absorbed by the vines and stored in the tubers makes a huge difference in taste and texture.

An Open Source Project

This is an invitation to join the Kenosha Potato Project. Years ago we started to collect potato tubers and wished to simply create a local genebank. With the advent of Social Media we now have members all over the world, from Canada to Brasil, Korea to Pakistan, Iceland to South Africa. Please find the Kenosha Potato Project on Facebook and participate by posting your experience growing the potato.

More information, growing tips and a video presentation of the Kenosha Potato Project can be found on our web page www.kenoshapotato.com. There is now a link to an hour-long video documentary detailing the Kenosha Potato Project in the summer of 2012 on the web site.

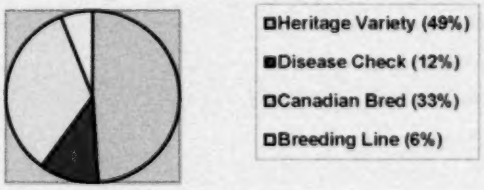
Annual Report 2012
Potato Gene Resources Repository

Teresa Molen

The Collection

1. Holdings

• The Potato Gene Resources (PGR) Repository contains 166 clones. Of this total, 164 are maintained *in vitro*, and 100 clones were grown for tuber production at our Benton Ridge Potato Breeding Substation, Benton, New Brunswick. A full listing of accessions may be found on the attached request form. The following chart shows the percentage of clones in each Repository category.



2. New Accessions

• Four clones were added to the *in vitro* Repository in 2012. Two new heritage varieties, "Arran Victory" and "Early Ohio", were donated by Cate Henderson, a

gardener/seed saver at the Heirloom Seed Sanctuary of the Sisters of Providence of St. Vincent de Paul, in Kingston, Ontario. Virus free *in vitro* plantlets were obtained from the Plant Propagation Centre of the New Brunswick Department of Agriculture, Aquaculture and Fisheries located in Fredericton, New Brunswick. Two new Canadian-bred varieties, "Exploits" and "Glenwood Red" were acquired from the Potato Breeding Program at the Potato Research Centre, Fredericton, New Brunswick.

Arran Victory – "Arran Victory", named in celebration of the end of the Great War, was bred by Donald Mackelvie in 1918 on the Isle of Arran, Scotland[1]. A maincrop maturing variety, this seedling of "Suttons Abundance" produces oval, blue-skinned tubers with white floury flesh.[2]

Early Ohio – "Early Ohio", a seedling of "Early Rose", originated in the United States of America with Alfred Reese in 1871.[3] It has medium to large spreading plants with white blossoms and produces round-oblong tubers with smooth, pink skin and white flesh.[3]

Exploits – "Exploits" was bred by Kenneth G. Proudfoot in 1993 at the AAFC Research Centre, St. John's, Newfoundland, from the cross N1614-5 x N69-478.[4] This medium-late-maturing variety produces round tubers with smooth, light yellow skin, moderately deep eyes and cream-coloured flesh. They are good for boiling.[4]

Glenwood Red – "Glenwood Red" was bred by Kenneth G. Proudfoot in 1991 at the Agriculture and Agri-Food Canada Research Centre, St. John's, Newfoundland, from the cross N637-6 x N1653-7.[4] This late-maturing variety produces medium-sized round tubers with smooth, light red skin, shallow eyes and white to cream coloured flesh. They are good for boiling and baking.[4]

References

[1]Devine, C. (2010). A guide to Scotland's potato varieties. The Larder. Scotland.
[2]The British Potato Variety Database website http://varieties.potato.org.uk/menu.php .
[3]Potato Handbook, (1959). The Potato Association of America.
[4]The Canadian Food Inspection Agency website: http://www.inspection.gc.ca/plants/potatoes/potato-varieties/eng/1299172436155/

• No accessions were lost from the inventory in 2012.

3. Evaluations

• Twenty-four varieties were grown in an evaluation trial at the Potato Research Centre. The evaluation plots consisted of two replications of fifteen hills of the following varieties: Kroop Neber, La Ratte, Congo, Austrian Crescent, Shepody, Belle-de-Fontenay, Elmer's Blue, Six Weeks, Red Dutch, Eramosa, Bauer Grun Rote Auge, Heidzel Blue, Superior, Stella's Newfoundland, Purple Peruvian, Matsuyama, Yellow Fin, Chieftain, Purple Viking, Epicure, Peanut, Red Acadian, Early Rose and Kerr's Pink. Samples were also taken for Total Glycoalkaloid Analysis (TGA), photographs and culinary evaluation.

• Thirty-one clones were grown in 20 hill plots at the Benton Ridge Potato Breeding Substation, Benton, NB, to provide material for demonstration and cooking quality evaluation throughout the winter and spring.

4. Management

• Passport data for 157 PGR accessions is available on line at the Genetic Resources Information Network-Canadian Version (GRIN-CA). GRIN-CA may be accessed through the Plant Gene Resources of Canada web site http://pgrc3.agr.gc.ca.

• Disease testing was conducted for new *in vitro* accessions and clones which have been maintained *in vitro* for five years. Thirty-five clones were grown in the greenhouse and tested twice in 2012. All clones were negative for PVA, PLTV, PotLV, PVS, PVX and PVY. Results for PSTV and BRR are pending. Extra minitubers from the greenhouse grow out will be offered to PGR clients in the spring of 2013.

• All *in vitro* clones were screened twice in 2012 for bacterial and fungal contamination using potato dextrose broth and Richardson's broth. All clones currently in the Repository are negative for these contaminants.

• A total of 740 microtubers were harvested from 162 of the PGR clones in 2012. Approximately half of the microtubers were sent to Saskatoon in October 2012 to be stored as back-up at Plant Gene Resources of Canada, AAFC. The viability of the Repository is protected by this remote location storage arrangement. Dallas Kessler, of Plant Gene Resources Canada, Saskatoon SK, continues to monitor and evaluate the microtubers. The remaining microtubers are stored at the Repository.

5. Distribution

• Twenty-nine requests for 978 clones were received in 2012. Of this number, 172 clones were distributed as *in vitro* plantlets, 684 clones as field-grown tubers, and 122 clones as greenhouse grown mini-tubers. "Congo", "Candy Cane" and "Elmer's Blue" were the most requested accessions in 2012. They were followed closely by "Angelina Mahoney's Blue" and "OAC Royal Gold".

Distribution of Clones by Purpose - 2012

Purpose of Request	Number of requests	Clones	*In vitro* plantlets	Field tubers	Mini-tubers
Research	20	781	159	500	108
Teaching or Demonstration	2	46	0	46	0
Conservation	7	151	13	138	14
Totals	29	978	172	684	122

Requests by Destination – 2012

Destination	Number of requests
Newfoundland and Labrador	2
Nova Scotia	1
New Brunswick	6
Quebec	4
Ontario	8
Saskatchewan	1
Alberta	2
USA	5
Total	29

Five-Year Compilation of Clone Distribution for Potato Gene Resources 2008-2012

Year	Research	Education	*Conservation	Total	Field tubers or mini-tubers	*In vitro* plantlets	Micro-tubers	Total
2008	9	39		48	345	210	0	555
2009	9	48		57	311	203	141	655
2010	4	15		19	295	171	0	466
2011	6	3	23	32	456	212	0	668
2012	20	2	7	29	806	172	0	978
Total	48	107	30	185	2213	968	141	3322

*This category of clone request was added in 2011.

Repository Items of Interest

Communication

• In addition to the requests for clones, many requests for information about the Repository, the availability of clones, clone descriptions and pedigrees, and techniques for handling *in vitro* material were received throughout 2012.

• The annual Potato Gene Resources newsletter has a distribution list of 300 recipients and is made possible by the administrative support of Ms. Sylvie LaForest.

• The current newsletter and several back issues may be accessed on the Weekly Checklist of Government of Canada Publications. Browse for the newsletter by title at: http://www.publications.gc.ca.

• An article titled "*Back to the future: Collection of older potato varieties sows seeds for the future*" highlighting the Repository, was included in a tabloid celebrating the 100th anniversary of the Potato Research Centre. The tabloid can be found at the following web address: http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1345559675096&lang=eng#alt.

Meetings

1) Dr Benoit Bizimungu, curator of the potato genetic resources, served on an international expert meeting on genebank standards for plants with non-orthodox seeds and *in vitro*-propagated species. The meeting took place at Bioversity International, in Maccarese, Rome from January 31 to February 2, 2012. The conservation of non-orthodox seeds and clonally-propagated species requires different strategies and approaches than those used for orthodox seeds, and their conservation is becoming increasingly important with the concern of climate change. Genebank Standards were initially developed to respond to the need for appropriate standards for international *ex situ* conservation and concerned solely with the storage of seeds of orthodox species. Since their first publication, a significant number of technical advances have occurred in the fields of conservation and use of plant genetic resources, especially in the area of biotechnologies. Although these advancements are still species-specific, they are central to improving genebank management and optimizing use of resources. The objective of the meeting was to discuss and refine the genebank standards for plants with non-orthodox seeds and *in vitro*-propagated species. These standards will provide an internationally accepted framework to monitor the viability and the genetic integrity of genebank collections.

Group photo at the international expert meeting on genebank standards for plants with non-orthodox seeds and in vitro-propagated species.

2) Dr. Benoit Bizimungu, curator of the potato genetic resources, participated by teleconference in the annual Technical Advisory Committee meeting of the USDA potato genebank NRSP6 project, held at Texas A&M University, College Station, TX, on April 17-18, 2012. Information on the genebank and minutes of the meeting can be found at the genebank website: http://www.ars-grin.gov/nr6/admin.html.

3) Dr Benoit Bizimungu, curator of the potato genetic resources, participated in the First International Symposium on *in-vitro* conservation and cryo-preservation of plant species, held at the Mexican National Genetic Resources Center, Tepatitlan de Morelos, Mexico June 27-29, 2012. The objective of the symposium was to forge collaboration networks and to exchange recent results in the field of research on plant genetic resources conservation and cryo-preservation. The agenda included keynote presentations from national and international speakers, short communications, posters, presentations and hands-on demonstrations of cryo-preservation techniques.

Displays

• Posters were displayed at the Potatoes New Brunswick Conference in February 2012.
• An AAFC exhibit at the Fredericton Exhibition held on September 2-8, 2012, focused on the Centre's centennial and featured material from the Potato Gene Resources Repository.

Visitors of the Repository

• March 21, 2012 – Scientists from the State Priekuli Plant Breeding Institute from the Ministry of Agriculture of the Republic of Latvia

Latvian Potato Researcher, Ilze Dimante, examines in vitro plantlets on display at the Repository with Potato Breeder and Repository Curator, Dr. Benoit Bizimungu. Photo by Wayne Riley, AAFC.

• May 4, 2012 – North Tay 4-H Club, Stanley, NB

• June 15, 2012 – Members of the Canadian Farm Writers' Federation (CFWF)

• September 6, 2012 – Members of the Canadian Horticultural Council

• September 25, 2012 – Dr. Della Johnston, Director, Biodiversity and Collections, AAFC

Dr. Della Johnston, Director, Biodiversity and Collections and Research Scientist and Germplasm Curator, Dr. Benoit Bizimungu during a visit to the Repository.

Update on the Repository's New Lab

• The renovation and development of a new laboratory space for the Potato Gene Resources Repository at the Potato Research Centre discussed in previous newsletters is complete. This includes a secure room to house controlled-environment cabinets (Growth Cabinet Room), a media preparation and sterile transfer room (Laboratory) and a separate glassware preparation room. The facility now meets international standards by providing adequate security of the germplasm in the Repository as well as the required space to support the work in an efficient and secure manner.

Potato Research Centre Web Site

• http://www.agr.gc.ca/researchcentre/fredericton offers an overview of the mandate, resources and achievements of the Centre. The research studies being conducted at the Centre as well as the staff associated with those studies is highlighted. Links to the Potato Research Network and to other agriculture- and potato-related web sites are also available.

Plant Gene Resources of Canada

• Plant Gene Resources of Canada (PGRC), the national Canadian genebank, preserves, characterizes and distributes plant genetic resources for food and agriculture. PGRC is based on collaboration between AAFC Research Centres and people dedicated to preserving the genetic diversity of crop plants and their wild relatives. PGRC plays a significant part of AAFC's commitment to the Canadian Biodiversity Strategy in response to the Convention on Biological Diversity and the International Treaty on Plant Genetic Resources.

• The Plant Gene Resources of Canada (PGRC) web site located at http://pgrc3.agr.gc.ca includes information on the PGRC multi-nodal system of germplasm conservation in Canada and allows searching for germplasm information on the Genetic Resources Information Network-Canadian version (GRIN-CA). Dr. Axel Diederichsen, Research Scientist and Curator at PGRC, can be contacted at the Saskatoon Research Centre of AAFC at axel.diederichsen@agr.gc.ca. PGRC is headed by Dr. Della Johnston, Director, Biodiversity and Collections, Ottawa (Della.Johnston@agr.gc.ca).

The Repository and Seed Potato System

The Potato Gene Resources Repository provides *in vitro* plantlets and greenhouse or field tubers for breeding, research and heritage preservation. While extensively tested for freedom from disease, the plantlets and tubers distributed by the Potato Gene Resources Repository are produced outside the Canadian Seed Certification System and are not eligible for certification.

The Canadian Seed Potato Certification System operates under the Seeds Act and its regulations. Certification begins with tested plantlets established *in vitro* in a facility accredited for this task by the Canadian Food Inspection Agency. The plantlets are used to produce greenhouse tubers which then go to the field in a limited generation system, each step meeting strict standards specified in the regulations. More

information on potato seed certification can be found at the following website: http://www.inspection.gc.ca/plants/seeds/eng/1299173228771/1299173306579.

Potato Gene Resources Newsletter

The Potato Gene Resources Newsletter is an annual publication of the Potato Gene Resources Repository, Potato Research Centre, AAFC.

The Newsletter provides information on potato germplasm in the Repository and on issues related to the genetic diversity in the potato. The opinions expressed by authors may not necessarily represent the views of AAFC.

Personnel of the Potato Gene Resources Repository and Potato Breeding Program Potato Research Centre

Benoit Bizimungu – Potato Breeder and Germplasm Curator
Agnes Murphy – Plant Pathologist
Teresa Molen – Potato Gene Resources Technician
Stephen Allaby – Potato Breeding Technician
Deborah Campbell – Potato Breeding Technician
Jean-Louis Deveau – Potato Breeding Technician
Denise LeBlanc – Potato Breeding Technician
Cynthia Murray – Potato Breeding Technician
Esther Tremblay-Deveau – Potato Breeding Technician
Donna Wilson – Plant Pathology Technician
Andrew Gardner – Supervisor – Greenhouse
Danny Burnett – Greenhouse Person
Sylvia Holder – Greenhouse Person
John MacDonald – Greenhouse Person

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Potato Gene Resources

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